THE TEXTILE WORLD RECORD
KINK BOOKS

No. 2

# Kinks for Wool Carders and Spinners

Compiled from the
QUESTIONS AND ANSWERS DEPARTMENT
of the
TEXTILE WORLD RECORD
for its subscribers only

LORD & NAGLE COMPANY
Publishers
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# PREFACE

The purpose of this book is to present in a compact form the views of experienced superintendents, carders, and spinners on problems which are ever recurring in carding and spinning rooms. The best of mill men face conditions every now and then when the views or methods of another are helpful.

For years, the subscribers to the TEXTILE WORLD RECORD have been invited to make free use of its columns and staff in securing practical information. This involves much expense in labor and money, but it is our policy to get the information for our subscribers and publish it in the Questions and Answers Department

Many subscribers preserve and file or bind back numbers for reference and it occured to us that if some of the most important and most interesting of the practical questions on special subjects which have been answered, were bound together in handy form for quick reference, such a volume would meet a wide-spread want. Kinks for Knitters was published. It is similar to this volume, but, as the name implies, is for knitters. Its contents were gathered from the note-books and experience of knit-goods manufacturers, superintendents and overseers, and its practical value gave it immediate success, as was expected.

Kinks for Carders and Spinners is now offered, free, to subscribers to the TEXTILE WORLD RECORD and is

not available to others. As the subscription price to the TEXTILE WORLD RECORD is very low, amounting to less than eighteen cents a month, or two dollars per year, Kinks for Carders and Spinners is certainly within the reach of anyone interested in its contents.

Many questions are answered and much information given within the small compass of this book, but subscribers should remember that if there is any information they desire, which is not given in this volume, it is their privilege to ask the Questions and Answers Department of the TEXTILE WORLD RECORD, and every effort will be made to publish the information for them, provided the question is one of general interest to the trade.

No effort has been made to arrange the subjects in the order of precedence in manufacturing, but the book is fully indexed, which should enable anyone to find the information he seeks in the shortest possible time.

Grateful acknowledgment is due to the men who have supplied the information, and if Kinks for Carders and Spinners should benefit any of the large number of men for whom it is intended, both they and the publishers will feel that its mission has been accomplished.

TEXTILE WORLD RECORD

LORD & NAGLE COMPANY

*Publishers*

# KINKS FOR CARDERS AND SPINNERS

## Blending and Oiling

Can you give me the method of blending and oiling three lots of wool; viz., No. 1 blend; 500 lbs. of all-wool Saxony, Australian or No. 1 Ohio fleece, spun to 10 run; No. 2 blend, 500 lbs. of coarse wool; No. 3 blend, Oxford Mix, 500 lbs., composed of 125 lbs. black wool, 125 lbs. white pulled wool, 250 lbs. black shoddy.

Deering (1068).

Carders as well as superintendents have a tendency to overlook the importance and value in this department of having their batches blended and oiled as they should be. Too much emphasis cannot be laid on the importance of having the batches properly blended and oiled to make good carding and spinning. Carders should watch with great interest this part of the operation for their own benefit, as well as for the company's.

### Fine Wool

No. 1 blend: 500 lbs. all-wool Saxony, Australian or No. 1 Ohio fleece, spun 10 run. We will first run it through the wool duster and then through the burr picker. Lay down in five layers. To each layer spread on 8 qts. of oil (olive oil would be best). Beat down each layer with a pole. When through blending,

run through the picker twice, feeding light and mixing well in gauze room. It is now ready to sheet up. Let it lie four days in the sheets before going to the cards. When ready for the cards run through picker once. Eight quarts of oil to 100 lbs. No water.

### Coarse Wool

No. 2 blend: 500 lbs. of coarse wool run through duster and burr picker and laid down in five layers. To each layer spread on 4 qts. of oil and 10 qts. of water. Pole each layer. Run through picker twice. Four quarts of oil, 10 qts. of water to 100 lbs.

No. 3 blend: Oxford mix; 500 lbs. batch wool and shoddy, 125 lbs. black wool, 125 lbs. white pulled wool, 250 lbs. black shoddy. Fifteen quarts of oil, 20 qts. water. This is allowing 6 qts. of oil to 100 lbs. of wool and 8 qts. of water to 100 lbs. of wool; nothing for shoddy. If desirable, more oil and water can be added. Mix black and white wool together and run through wool duster and burr picker. Run the shoddy through mixing picker. Make five layers of wool and five layers of shoddy. First layer of wool put on 3 qts. of oil and 4 qts. of water. Beat well with pole. Then put on layer of shoddy; beat with pole. Next, a layer of wool and then a layer of shoddy alternately until finished. In feeding, take top to bottom of pile. Feed on light and run through the picker three times, mixing well every time.

You will notice that I do not put any oil or water on the shoddy, but put it on the wool. I will give my reasons for doing so: First, the shoddy has already received enough oil during the process of manufacturing. Second, it will not fill and gum the cylinder and doffer wire with flocks and fine dust. Third, the cards will run longer without stripping. Fourth, it makes more even, smoother and stronger yarn, and it cards and spins better.

The same rule for the blending and oiling of this batch can be applied to any percentage of wool and shoddy. To those using emulsions, the same percentage of oil and water can be used and batches laid down the same way, but keep the emulsions from getting on the shoddy and cotton as much as possible.

Sam Driver.

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## Setting Mixer Picker

We are running a mixing picker with concave feed rolls which seem to raise havoc with the staple. Will you give me some pointers on how the machine ought to be set so I can compare them with our machine. Daniels (1131).

1. The picker should be set on a solid foundation so that there will be no vibration.

2. The spiked feed roll and concave dish should be set as close as possible to the cylinder teeth and not strike. This will keep the feed roll from winding stock.

3. The feed roll should be set down in concave within half an inch of striking. If set way off the stock will dwell in concave and cause it to cut the staple. Save the staple.

4. The feed rolls and apron should run as fast as the cylinder will take it. This saves the staple, because there will be no chance for the stock to dwell in the concave.

5. The grates and outlet kept clean and not allowed to get filled up with dirt under the picker. This will give a better draft and the picker will do better work. The stock will be cleaner.

6. Plenty of ventilation back of the gauze room, and the belts all good and tight.

With a picker equipped with spur teeth feed rolls the feed rolls must be set as close to the cylinder as on concave feed; everything else the same. D. R. S.

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## Emery Cloth on Traverse Grinders

Can you tell me whether traverse grinders are ever covered with emery cloth. I have heard that they are but I have not seen one.
Bowie (1137).

Traverse grinders can be covered with emery cloth and are in general use in cotton card rooms. To fasten the ends of emery cloth or filleting, two small slits are sawed on each side of the emery wheel. Then the ends of the cloth are put through these slits and fastened

on the inside of the wheel by small clamps. Put on a very light coat of glue and wind in the same as with any other filleting. D. V.

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## Carbonizing Rags for Shoddy

I would like to get a description of the process of carbonizing woolen rags to be used for shoddy.
Emsley (979).

Carbonizing is done either by the wet, sulphuric acid process or by the dry or muriatic acid process. The wet process takes a longer time to accomplish the same result, as will be readily seen by comparing the two methods.

To carbonize by the wet process a kettle 7 feet long, 4 or 5 feet wide and 6 feet deep, lined with lead, is used, into which is placed a basket made with a perforated wooden bottom, solidly built and held in place by four joists of 4-inch timber, one for each corner. The basket has no sides and is made to fit snugly in the kettle, so it can be lifted out as required. This may be done by arranging a hoist over the kettle so the liquor can drain back. Then the rags are taken to the extractor, which should be conveniently located, and thoroughly extracted. The extractor should be provided with a small well or receptacle in the floor, say, 3 feet square by 3 feet deep, also lined with lead, to receive the overflow from the extractor, and which can then be returned to the kettle.

The rags are then sent to the dryer and dried at a temperature of not less than 250 degrees F.; then, if they are to be neutralized, they are run to a washer and washed in a slightly alkaline bath, produced by adding a small quantity of soda ash to cold water in the washer, or the soda ash and water are boiled together and part of the solution added to the liquor in the wash machine. The rags are then extracted and dried.

To carbonize 500 pounds of woolen rags fill the receptacle about three-fourths full of cold water and add sulphuric acid until the liquor registers 7 Be. Enter the rags and let them soak from five to seven hours, according to the grade of rags being carbonized. Good judgment is necessary here, as the quantity of acid used depends upon the amount of cotton in the rags, the usual strength is from 6 to 9 Be.

To carbonize by the dry process the rags must first be thoroughly dusted and dried. A machine of special construction is required, consisting of an outer oven of brick, enclosing a revolving cast-iron oven, into which the rags are placed; a retort for the muriatic acid, also bricked; and two fire holes, one under the retort, and the other at the side to heat the machine. The heat is evenly distributed by means of flues arranged under the machine. The machine must be kept at a temperature of about 130 degrees F., in order to do its work properly, and the retort fire cannot be too hot

while the acid is running into the retort, as that is when the work is done. The muriatic acid (22 per cent.) is placed in a 3-gallon crock and suspended on a shelf above the retort. The crock is specially made for this purpose and has an opening on the side near the bottom to allow a spigot to be driven in, and the acid runs slowly into the retort, through a small granite pipe made for the purpose. The heat forms the acid into a gas before it strikes the machine, and this gas does the carbonizing. If the acid runs into the retort too fast a moisture will be formed in the machine and the rags have to be re-dried. The average length of time required to carbonize by this process is from one to two hours.

By taking a small swatch of goods from the machine and rubbing it between the fingers it can be determined whether the process is finished; if so, the cotton in the rags crumbles to dust. The batch should then be drawn from the machine, and the machine re-loaded as rapidly as possible, so it will not become cooled. By this means another batch can be carbonized while the first is being dusted and washed.

This process does not affect the colors of the goods as much as the wet process, and they may be brought back to their original colors by the use of a small quantity of a soda ash and soap solution. To prepare this solution, fill a barrel with water and add one pail of soda

ash and 10 pounds of soap; boil until the soap is dissolved, when it is ready for use. About three pailfuls of this liquor is added to the water in the washer. The rags are then taken to the duster, dusted thoroughly, washed well, extracted and dried.

The duster, extractor, and washer should be placed as near to each other as possible and allow room to work comfortably. To carbonize 500 pounds of woolen rags by the dry process requires from 30 to 40 pounds of muriatic acid (22 per cent).

Henry Hutton.

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## Fixing Bramwell Feed

We are troubled with very uneven work and the superintendent thinks that the trouble is caused by a Bramwell feed. I am sure I do not know where the fault lies as we have looked over everything carefully and it may be the feed. Will you give me some information showing how the feed ought to be fixed?

Butler (1214).

It is quite probable that your Bramwell feed is of early manufacture. The modern Bramwell feed has many improvements, not only in the shape of better construction throughout, but also in the attachments which make the feed much more sensitive, so that it gives evener, therefore, more satisfactory work. If this is the case, the old Bramwells can at a comparatively small cost be modernized, so to speak,

so that their life will be renewed for many years of usefulness and the work greatly improved.

In the first place to make even work, the stock must be evenly prepared, mixed and oiled before it comes to the card room. The Bramwell feed should be set level and on a line with the first breaker. The top of the feed table should be set a little below the center of the bottom feed roll and one-half inch from the feed roll. If the stock is crowded in the feed it will make heavy drawing; if it gets too low in the feed it will make light drawing: two extremes. To make even drawing the stock in the feed box should be kept at one height as near as possible, and replenished a little at a time and often; when putting in stock do not press it down; let it have its own weight.

Putting in too much roping waste at one time and in one place will make uneven drawing. Waste should be pulled up some and mixed in with the stock a little at a time, just enough to keep up. It should be mixed in every time the stock is put in.

Sometimes the points of pins on the apron get covered with waste, making uneven feeds and uneven drawing: remedy, keep clean. The pins on the side of the apron get broken off by setting the comber too close, set the comb farther off and have the pins replaced.

This sometimes is the cause of the feed being heavier in the middle than the sides. If the stock is heavier on the middle of the cards than on

the sides, the grate on the bottom of the Bramwell feed can be easily taken down and cleaned out every lot. This grate is good for shives, leather, wood, wire, etc., to drop through and these articles will often be found on the grate. These sometimes get caught on the apron pins, causing the apron to stop.

See that the attachment that operates the slat pusher and comb to and from the apron as the stock in feed gets low, is in working order. When the stock is low in the feed the comb should move farther off the apron, when in working order.

When a lot is running out and the stock in feed gets low the feed tender should be on hand or some very uneven drawing will be made. If the catch slips when taking off the large apron, take it off and file it; at the same time file the ratchet pulley teeth on apron shaft.

Setting the comb too close to the apron and running it faster than necessary will break the staple. Save the Staple.

Do not run any large apron faster than need be; sometimes the feed tender when wiping feed will knock the feed off before balanced, causing uneven drawing. That is the reason for "Hands Off" painted on the scale. The writer has often seen very uneven drawing made by the scales dumping before they were balanced. Remedy, speed the apron faster or set the comb further off the apron.

Automatic feeds are made adjustable and if

properly adjusted can be made to do good work. When the catch inside of ratchet gear clicks after the scale is balanced, tighten up the little friction snap on the end of the large apron. If using a large per cent. of shoddy or cotton mixed with wool, the pins on the large apron will naturally carry more wool than of the shoddy or cotton. This will make uneven drawing that can be remedied in two ways: First, by setting the comb further off the apron; Second, by placing a board ¾ inch thick and 12 inches wide inside the feed under the comb. Set the comb down to the lowest point, then set the board up to within 4 or 5 inches from the apron pins. Place the lower end of the board 5 or 6 inches from the apron pins. The edges of the board should be planed to a bevel.

With this appliance the stock will be laid more evenly on the pins and make a more even feed. The feed box must not be too full or uneven drawing will be the consequence.

With the arrangement for stopping the two aprons at the same time after the scale is balanced, a much more even drawing can be produced with the Bramwell than formerly.

The small apron or fan is the most neglected part of the Bramwell feed and still it is one of the most important parts in getting a nice, even feed. This apron should always be in good order and set up to pins on long aprons just alike. The stock in both ends and middle of scales will be alike. The writer has found

this apron in all kinds of shapes, making very uneven drawing.

### Balancing the Scales

On one side of the feed is the scale beam, on which is a movable weight. On the other side of the feed is another scale beam with balancing weight. Place both weights at an equal distance on the scale beams on both sides until the scales are balanced; when balanced, tighten the balancing weight, which will be stationary; then move the movable weight back according to the quantity of stock you need in the scales. Set the scale pans so that the bottoms will come evenly together at both ends, don't have them overlapping each other. If the bottoms of the pans are crooked, take them out and straighten them.

The balancing points, which are V-shaped studs attached to scale beams, should be kept sharp. The accuracy of weighing depends on these points. The V-shaped sockets bolted on side of the feed for the V-shaped stud to fit in, should be kept clean and oiled. See that every nut and bolt is tight. A large amount of uneven drawing is made after the stock leaves the scales by having the scales too full and too heavy a feed. Never have the scale pans more than two-thirds full on any kind of stock or for any size of yarn to be made.

For example, we will change off from 5 run fine wool to 2½ run coarse light wool. If we

alter the weight on the scale for this the scale pans will be heaping up full and so would the feed table. This would make uneven drawing, but we must not alter the scale weights until we see how full the scale pan is going to be. If the scale pan fills two-thirds full it is just right. Don't have it more nor less than two-thirds full under any circumstances. Bring up the weight by altering feed gears on card. The pushboard on the feed table should be set back so that it will not push the stock under the beater. When the stock drops from the scale it should drop on the edge of the last feed forming a splice. It is where this splicing is that causes uneven drawing and also causes the drawing to break down. Do not have the beater too low. Many little things amount to big things; even yarn cannot be made from uneven drawing. D. R. S.

## Fine Ends on the Apperly Feed

I am having trouble with the side ends coming fine on the finisher of a card that is equipped with an Apperly feed. Can you suggest any remedy? Bunker (731).

There are many things that cause the outside strands to be fine at times. I would advise Bunker to take out the doffers and give them a good light grinding. Then I should give them a good brushing with a hand card covered with wool. Grind all day if necessary, or until

they are perfectly true. Perhaps the waste ring is a trifle higher than the others. In that case I should move the outside or waste ring out 1-16 or 1-8 of an inch so the ring next to it on the other doffer would deliver heavier roving. The spare ring may steal from the ring next to it. When I had trouble with the outside end being fine I used to take out the packing of the spare or waste ring and move it out 1-16 or 1-8 and that would bring up the outside strands to their proper size. I should incline the overhead drawing on the side that was fine. Sam Driver.

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## Carbonizing

Is acid sulphate of soda ever used in place of sulphuric acid for carbonizing wool.?

Itasca (636).

Acid sulphate (or bisulphate) of soda is not employed for carbonizing wool; the commonest, and perhaps most generally satisfactory agents used are sulphuric acid, and hydrochloric acid gas, generated from salt and sulphuric acid. In Germany, magnesium chloride is used with good results.

There is no doubt that bisulphate of soda can be used, but there is always a tendency for soda spots to show wherever such chemicals are employed. Beta-Naphthol.

## Qualitative Tests for Fibres

Can you give me a few qualitative tests for textile fibres? Walton (974).

The following is a list of tests that was published in the Textile World Record some time ago:

1. Microscopic Appearance.

2. Cotton burns without smell, while wool and silk shrivel up and give off the odor of burning animal matter.

3. A boiling solution of caustic alkali dissolves silk and wool, but has little action on cotton.

4. Concentrated sulphuric acid dissolves cotton and silk in the cold, while wool is little affected.

5. Schweitzer's reagent (ammoniacal solution of oxide of copper) dissolves cotton and silk, but not wool. Cellulose is reprecipitated by gum, sugar, or acids, but the silk substance by acids alone.

6. A solution of basic cholride of zinc dissolves silk, but not cotton or wool.

7. A solution of cotton in concentrated sulphuric acid gives a purple coloration with an alcoholic solution of alpha-naphthol. This reaction really indicates the presence of sugar, and is therefore not given by silk or wool.

8. Million's reagent (mercurous-mercuric nitrate) gives a red color with silk or wool, but not with cotton.

9. Wool (also hair and fur) is blackened by heating with a dilute solution of plumbite of soda, which is prepared by dissolving litharge in caustic soda. Silk and cotton, as they do not contain sulphur, are unaffected in color.

10. Nitric acid colors wool and silk yellow, but does not affect cotton.

11. An acid solution of indigo extract dyes wool and silk, but not cotton.

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## Automatic Oiler

Will you describe an automatic oiler and explain how the stock is delivered so that it can be oiled evenly? Fuller (992).

The Spencer Automatic Stock Oiling Machine is bolted to the sides of the picker feed apron and consists principally of a revolving brush on which the oil or emulsion is dropped by a vibrating pipe which leads from a small tank at the top of the machine. The brush strikes against a metal blade and thus converts the oil or emulsion into a spray, which is thrown evenly on the wool as it passes over the picker feed apron from the feeder to the picker. It thus penetrates the stock thoroughly and reaches the individual fibres effectively and with a perfect uniformity.

As will be readily understood, the forward motion of the material, and the quantity of the oil sprayed by the brush, can be regulated at will by the operator of the machine.

The even feeding of the Bramwell picker feed made the Spencer oiler feasible and together the two machines do away with the old-fashioned method of feeding and oiling stock by hand.

The advantages of the Spencer oiler are as follows:

Saves labor

Is cleaner — no oils on walls or floor

Better results — not too much oil here and not enough there, but all oiled alike and just right amount

Saves oil

Better results in all subsequent processes, especially carding, because the stock is better prepared for proper handling.

J. M. P.

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## Putting on Card Clothing

I would like information on putting on card clothing as regards the apparatus required and the method of doing the work.

Deary (1042).

It is necessary that every card room should be provided with a suitable frame and drum for winding on filleting. It is important that it should be wound on with as even a tension as possible. The frame should be made strong and wide enough so that the bearings of whatever is being covered will set firmly in the bearings of the frame. Place collars on the shafts so that when winding on filleting they will not

vibrate. Bolt on the frame a slotted bracket with a long stud and a small gear, with crank attached. Place a large gear on the shaft of whatever is to be covered, and gear into the small gear. By winding this way a much steadier motion and more even tension can be had than with a crank attached to the end of the shaft.

The drum, if for a 48-inch card with doffer 48 by 30, should be made 54 inches wide and 31 inches in diameter. The drum must be turned off true and smooth so that the backs of the card teeth will not get bulged. A stout frame must be built for the drum and bolted to the floor.

A piece of belt 1½ inches wide, with small clamp attached, can be fastened to one end of the drum, another belt can be fastened on the floor on the other end and brought over the drum for friction. Some have the drum placed in front of the grinding frame, with a suitable bearing to bolt on the frame. When putting on filleting it should be wound on the drum quite tight. This will press and keep the backs of card wire in their proper place. The roll must be turned with a steady and even motion to keep an even tension.

The clothing should be wound on as tight as it will bear; if not, it will be apt to get loose and strike the cylinder and cause bad work and be a source of trouble all the time.

D. R. S.

## Mungo and Shoddy

Can you tell me the difference between the terms mungo and shoddy, as used in the Yorkshire textile industry? Devoe (947).

The product known as mungo is made from hard rags of fine quality only. Shoddy is made from soft and coarse rags. This is the correct distinction, and it naturally follows the manipulation of the rags must be varied to suit the product. For mungo, a fine tooth cylinder is required. The speed is generally 600 revolutions per minute, and the teeth are set only $\frac{1}{8}$ of an inch from the feed rollers. Mungo is shorter than shoddy and is employed more for plain goods, piece dyes, than for fancy weaves. Mungo requires wool to support it, and a good blend for doeskin cloths is composed of two-thirds wool and one-third mungo. Delaine.

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## Putting on Doffer Rings

I would like to find the best method of putting on doffer rings. Any information you can give me will be appreciated, as we have never found a satisfactory method of fixing the doffers. Burdick (1523).

Carders have different opinions as to the width of rings and the numbers of wire. Some object to the waste end ring being wide. By having the ring wide it saves waste and a deal of trouble from the outside ends of the spools being lumpy, fine, or coarse. Some will

say: How can a wide waste ring save waste? It will save waste by allowing the traveler to be set so that the loops in drawing will not come to the extreme edge of the cylinder, thereby saving the stock from dropping down on the ends of the leader-in and also reduce the flyings on the sides of the cards, thus keeping the card cleaner. The waste end rings should be at least 1½ inches wide.

Every carder knowns the annoyance and trouble from the outside ends on spools. If on some lots the outside ends are heavy on the spools from some cause, move the waste end ring inward; if it is too fine, move it outward. This will make the outside strand on the spools coarser or finer.

Putting on rings requires care and accuracy; they must be true, or uneven roping will be the result. For a 48-inch finisher with Apperly feed taking off 48 good strands, on the top doffer there should be 24 rings, 14-16 wide, and one waste end ring 1½ wide, 35 steel wire; on the bottom doffer, 24 rings, 1 inch wide, and one spare end ring 1½ inches wide, 35 steel wire; making 48 inches of wire covering the cylinder wire.

Before putting on the rings clean the doffer well and fill up the blow holes, if any, with plaster-of-Paris; this is better than lead or putty as it does not corrode when the oil strikes it and start a bunch under the ring. Oil the surface of the doffer slightly with sweet oil

before putting on the rings; they will slide down easier.

Have a cone-shaped pulley made from a 2-inch board with the base the exact diameter of the doffer, and the point ¾ inch smaller than the base. Put this on the doffer shaft with the base squarely against the end of the doffer. This pulley should be shellacked and made perfectly smooth. Have a board 1¼ inches thick and 14 inches square with strips of wood screwed on the ends to keep it from splitting. Cut a hole through the centre a trifle larger than the doffer. Before putting on the rings examine every one to see if the wire is all right on the back. Then put a ring over the cone pulley and on the doffer; then with the drawing board slide the ring down to its place.

After getting on the rings we want a ring board made as follows: Get a piece of wood 72 inches long, 1½ inches thick and 4 inches wide, planed to a straight edge. To mark it off, place it on doffer bearing arms, get a try-square, and with a sharp penknife mark off the exact width of the cylinder on the board. Then make another mark ½ inch wide inside the outer marks; we will then have the width of the wire on the cylinder, which is 48 inches. Now take the dividers and space off 1½ inches on each end; this is for the waste end rings. Now take the dividers and divide the intervening space into 48 equal parts for the 48 rings.

Next place the top doffer in the grinder frame

with the points of the teeth toward you. The reason for this is that if the tool you are moving them with should happen to slip it would only knock the wire back, which could be easily brought into place again; another reason is that the rings are then in front of you as if you were standing in front of a finisher.

Place the ring board in front and about opposite the centre of the doffer; set the outside marks on the board on a line with the outside edge of the doffer; set the board as close to the rings as possible; see that the collar on the doffer shaft and all the bearings are tight. The doffer and the board are set level, and we are now ready to slide the rings into place. Get a piece of flat iron $\frac{3}{4}$ inch wide, $\frac{1}{4}$ inch thick, 15 inches long; the points should be concave and smooth; a wide screw-driver does very well.

All being ready, start up the doffer and commence on the outside waste ring first. Before putting on the packing between the rings place both doffers together and see if the rings come opposite the spaces; it is very important they should, otherwise the roping will not be even.

In putting the packing between the rings some carders cut narrow pieces of filleting the right width and length and then cut a hole in each end and tie them on; some shave each end and tack or glue them on. The best and quickest way is to put a crank on the doffer shaft and wind small bundle twine in between

just as high as the leather on each ring. Great care must be taken not to wind too tight or it may cause the ring to move. Cut the next packing to go between the ring wire, just the right width; it is better to cut them too narrow than too wide. If they are too wide they will crush in the edge of the wire on the ring, causing uneven roping. Some carders tack them on, others glue them, cutting each end beveling. It is a good plan to fill the spaces to within 1-8 inch of the top of the wire; this keeps the stock from collecting on the edge of the rings; it also keeps the strippers from knocking down the wire when stripping. If the rings are put on right and there is uneven roping you know it is not the fault of the rings.

When ready, place the grinders on very lightly, don't try to hurry them, give them time, humor them some; they are sometimes very contrary. When done grinding take off the emery cylinder and strickle each one separately for half an hour, vibrating very briskly from end to end.

When grinding use plenty of wool oil on the emery; by using oil on the emery the points of wire will be much smoother than with the emery dry. Judgment must be used to decide when ground enough. When using the emery strickle, let it have its own weight on the wire. When ready to smooth and finish, take a new hand card or a good old one and fill it with drawing, changing it as often as it gets dirty,

vibrating it very briskly for an hour or more on each doffer. Don't be afraid of brushing them too long, the longer they are brushed the smoother they will be. This cleans out all the oil and emery dust and polishes the points of wire. If the rings are finished in this way the stock will never run back over them, which today is a great annoyance to most carders.

To gauge the top and bottom doffers when in the board, get a piece of 1-inch board, 15 inches long and 1 inch wider than the distance between the top and bottom doffer, and beveled on both edges. Mark the board off in spaces the same as the ring board and place in between the doffers when setting. This plan is far better than to use the plum-bob and more accurate. Sam Driver.

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## Random Roping

Will you publish in the Questions and Answers Department how Random roping can be made?

Random roping can be made with a creel on the finisher in conjunction with vibrating doffers. Everything must be adjusted just right, both doffers must be positive in their action and care must be taken to have the rings occupy their required space and position; then the rings will take up the required quantity of stock from each stripe. Every other drawing-in creel and guide is of a different color, say,

red alternating with green, etc. The roping will have at certain intervals a clouded appearance and then grow less cloudy, approaching almost a clear color, and then gradually reverse until the opposite color predominates.

D. R. S.

## Grades of Wool

What is the exact meaning of ¼ blood, 1-8 blood, etc., wool? Lehigh (853).

These fractional terms were originally meant to express the proportion of merino blood in the sheep. In the course of time they have become more or less arbitrary terms to designate particular grades of wool.

## Nubs for Knickerbockers

We are going to make a line of knickerbockers and I would like to get some information on making nubs; how to set the cards to get good yarn. Akron (983).

To make nubs for knickerbockers select short, fine wool and run it through the picker dry and then through a first breaker as follows: Feed on very light; set off the workers from the cylinder 3-16 of an inch; set the strippers just close enough to the cylinders to clear them; set the doffer with a 28-gauge. Do not run the comb; set the fancy just to touch the cylinder, start the card and the nubs will drop

under the card. For nubs larger or smaller set the cards accordingly.

These nubs are then taken to the fulling room and fulled until quite hard, then dried and they are ready for mixing. When the batch is ready for the cards set off the workers of the first breaker from 1-8 to 3-16 of an inch; let the strippers remain as they were, but set the workers off the strippers slightly; set the doffers as for regular work and the fancy the same.

Set the second breaker the same as the first, except that the worker next the fancy is set quite close to the cylinder. This is to regulate the size of the nubs required; set the fancy the same as on ordinary stock. Set the finisher the same as the first and second breakers, with the exception of the first and last workers. These can be set closer to the cylinder to regulate the size of the nubs. The best way to get the workers on both sides alike is to notice the number of turns on the nut before setting.

Sam Driver.

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## Stock Packing in the Cylinder

When a fancy packs the stock in a finisher cylinder more than it should, what is the best way to prevent it? What kind of fancy would do the work best? On the one we are using the cylinder wire is No. 35, and on the fancy No. 34. Would a straight wire open set do the work better? Bradford (842).

This is a point that many carders have trouble with and is the cause of a good deal of bad

roving. The first thing to do is to find out why the fancy does not keep the cylinder clear. It may be because the fancy is running too slow, because the wire has too much pitch, because the wire is too fine or too closely set, be worn to too fine a point, or because the stripper belt is slipping. For a 35-wire cylinder I prefer a 34-tempered steel straight wire open set. When a fancy is worn to a needle point it should always be ground, as the fine point will not raise the stock properly. Of course it does not need to be ground as long as it raises the stock well and is smooth.

As to the speed, I prefer the points of the wire on the fancy to go about 20 per cent. faster than the points of the wire on the cylinder, but there are times when this difference can be varied to good advantage; for instance, when the wire on the fancy stands a little nearer straight than usual. This would be likely to throw too much stock and should be run a little slower. Care should be taken not to get the speed down to that of the cylinder, also to keep the wood work on the fancy and the cylinder tight and perfectly true. I never turn off the wood work of a cylinder without first finding out that every burr on every bolt on the inside of the cylinder is tight. If proper care is taken in these particulars there should be no trouble in keeping the cylinder clear. A. B. H.

A straight wire open set would probably do the work better as Bradford suggests, and I

would advise using a 33 wire for the fancy and 35 for the cylinder. Other things might cause this trouble; the fancy might be set too hard against the cylinder, or be running too slow. Better look to these points before making any other changes. Sam Driver.

It is not stated what kind of stock is being run, but for all kinds — all wool, wool and shoddy, and cotton mixes — I should say that when the cylinder is packed more than usual it is not always the fault of the fancy. If the rings are not in proper shape to take what the fancy raises the cylinder will pack. By the rings being in proper shape, I mean that they must be very evenly ground, very smooth on top of the wire, free from any burrs, the side of the wire must be smooth, the wire must be firm in the leather, and the rings tight, so that it will not pull back by the stock coming in contact with it. If the cylinder wire is rough, or there is a burr on the point, the cylinder will pack. If the cylinder or wire ring is rough or burred, take four pieces of 1½-inch new fancy wire about five inches long, fasten them to a board about 14 or 16 inches long and 6 inches wide, and use it in place of a hand card, as it will not slacken the wire as a hand card will do. Use it while grinding, but do not hold it on backward, as it will take too firm a hold on the wire.

After being sure that the cylinder wire is not slack, is ground smooth, the rings tight and

ground even, and the cylinder still packs, then it is the fault of the fancy. A 10-inch fancy, set with 34 tempered steel wire, should be run about 505 revolutions a minute; a 48-inch cylinder, 84 revolutions a minute; that is, the fancy should run about two-thirds faster than the cylinder. If that will not overcome the trouble get a steel wire fancy, 29-33 straight tooth, 1 1-8 inches long, open set in leather and try it with the same speed. Set it about 1-16 of an inch to start. When putting on the fancy see that the wire is rubbed in well and on the backward way and tight enough so that it will be sure not to slacken. I think 1 1-8 inch wire is better on a finisher than a longer one, as it will not create so much draught, thereby interfering with the stock and making uneven work.

G. L. P.

Either the fancy is running too fast, or there is too much pitch to the wire. If the speed and set are correct, raise the pitch of the wire by running a blunt wide tool into it so as to straighten it a little. On my No. 35 wire finishers I am using a No. 30 steel open set, 1¼ staple low-bend fancy, on work from 1¾ run to 6 run, and get good results. If I knew more of their conditions I might be able to give a more definite answer. Henry Allman.

Assuming that the finisher cylinder is in good working order, and has no hooked or burred points and yet conveys too much stock, I should try a fancy from some other card,

no matter if the wire is a little coarser. A cylinder can be packed by running the fancy too slow, or not setting it close enough to the cylinder. If all these details have been properly looked after the next thing is to raise the wire and grind off the needle points caused by running the wire in contact with the teeth of the main cylinder. It will not do to try to raise the wire on the finisher fancy by running the blunt end of the turning tool against the teeth.

A plan I have always found successful is to set the fancy in the grinder and winding from the teeth pointing toward the operator. Then with a cleaning comb, ten teeth to the inch, pull the wire back and up with an oblique motion on every turn. After going over the whole fancy with the comb, take an emery board like those commonly used for smoothing, the finer the better, and while the fancy is being turned very slowly, rub lengthways to the right and left on the fancy wire, touching every point. Don't be afraid of bearing on. This operation takes off the needle point and gives a point that will keep the cylinder from carrying too much stock. Next clean out the dust this operation has made by holding a hand card against it for a minute or two, but be sure not to grind it. After setting it in the card, tighten the fancy pulley and belt, if they are at all slack. This plan of taking off needle points has only to be tried once to satisfy the most skeptical of its success. I always run the fancy wire

two numbers coarser than the wire on the cylinder. I think straight fancy wire is best.

Anthony.

## Setting the Fancy

We have changed our cards over to a coarse clothing for long coarse stock but have not changed the fancy. Now the doffer cannot take the stock from the cylinder and the clothing is choked up. We have tried setting the fancy deeper into the cylinder, running it faster, and have even bent the wire forward. Is there anything you can suggest that will help us out?

Foster (967).

This seems to be a case of saving the old fancy at any cost. As there is only one fancy on a card and as the cost of reclothing it with wire suited to the work would be small, I would suggest that Foster get clothing a little coarser than that on the cylinder. All the expedients for making the fancy do work it was never intended to do seem to have been tried, so I judge a very short stock had been previously used or the fancy was about worn out. The range of work that a fancy will do is large, but there are limits and when reached, the cost of new clothing should not be considered against the loss caused by makeshift devices.

Burleigh.

## Causes of Uneven Roping

I read a list of causes of uneven roping in the Textile World Record several months ago

and I cut out the article. It has been lost and I want to get another one like it, for there are some points in it that I had not heard before, and I've been in the card-room since I was a boy. Perhaps it wouldn't do any harm if you published it again. Dobney (937).

The portion of the article referred to by Dobney is as follows: When using creels on the second breaker never have a full set in at one time; have partly filled spools on one-half of the creel and full spools on the other half; the roping will be more even in this way. When all the spools run out together there are so many splicings that they cause the roping to be heavy for a time. The more spools there are in the creels the more doubling and the more even roping. One drawing out makes the roping finer.

Among the causes of uneven roping are imperfect cleaning and mixing of the stock, irregularity in putting on oil and composition, inaccurate weighing and feeding, feed rolls and other cylinders winding stock and filling up after stripping, strained drawings from second breaker to Apperly feed, belts and gears slipping, and inferior card-room help. Perfection in the form of all cylinders from the largest to the smallest is essential in making even roping.

If the ring doffer is out of true so that it comes nearer to the cylinder during one part of its revolution, there will be a gradual variation in the roping from coarse to fine and the increase and decrease will alternate in

lengths equal to the circumference of the ring. If the main cylinder is out of true so that one side runs nearer to the doffer than the other, the variations in size of roping will be repeated in lengths equal to the circumference of the cylinder. Uneven roping may also be caused by the workers, leader-in, tumbler and fancy being out of true.

These imperfections may not always be apparent to the naked eye and are not very easily detected. There is no doubt that these small things are the cause of uneven roping and of uneven yarn, besides an endless amount of trouble. The remedy is simple and consists in truing the small cylinder as well as the large one and keeping them true no matter how hard the cards may be driven. Quality first and then quantity is the best rule for both carder and manufacturer.

The feed rolls should be of the same size and perfectly true; if one is larger than the other, they will not deliver evenly, and this will be more or less perceptible in the yarn according to the difference in size between them. Another very frequent cause of uneven roping is the careless manner in which the pulleys are lagged with leather, making them untrue or lopsided, causing the belt to run slack or tight, thus driving them at unequal speeds and producing results similar to those from uneven surfaces.

A dull tumbler will cause uneven strands on the ends of the spools. Uneven feeds make un-

even roping. Another cause is defective setting of the ring doffers. If the fancy on the finisher is set too hard or runs too fast or the card runs too long without stripping, or if the cylinder is dull, fine strands will be made on the ends of spools and heavy strands in the middle. The first full spools made after stripping the cylinder should be torn up.

Crowding the stock in the first breaker feed and then letting it run nearly out is the cause of much uneven roping. The small pulleys of the Apperly feed should be cleaned and oiled every week. When weighing roping weigh the tops and bottoms, then the sides and the middle. The tops and bottoms should be spun separately. If making warp and filling from the same lot, the tops will make the strongest warp. To ensure even roping, the feed rolls, leader-in and tumbler should be faultless. If they are allowed to get filled with stock, the best results will not be obtained.

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## Production of Woolen Finisher Card

Please state the best method of calculating the production of a woolen finisher card. I have calculated the production of our finisher cards, from the weight of roving and size of doffer rings, but the results vary from 15 to 25 per cent from the actual product. The outside diameter of rings is 11 3-4 inches. The doffer makes 14 turns per minute. We are using 11 rub-roll condensers. The roving reels 1 1-2

runs as it comes from the condenser. There are twenty ends taken from each of the two doffers.
Iroquois (342).

The error in Iroquois' calculation is evident from his explanation. He has neglected to take into account the draft of the roving by the condenser. At our request Iroquois has informed us that the spool drum at the finisher is 29 in. in circumference, and makes 21 turns per minute, showing a surface speed of 609 inches per minute. The surface speed of the doffer, which is 11 3-4 inches in diameter and makes 14 turns per minute, is 517 inches per minute, consequently the spool drum winds 18 per cent more length of roving than the doffer is delivering. This increase is due to the draft of the rub rolls. Iroquois' error was due to his calculating from the speed of the doffer and the weight of yarn at the spool drum.

Taking the speed of the spool drum and weight of the roving at the spool drum as factors we calculate the production of the card as follows:

609 (in. per min.) × 40 (ends) = 677 yds. roving per min.

677 (yds.) ÷ 150 (yds. per oz.) = 4½ ozs. roving per min.

4½ (ozs.) × 60 (min. per hour) = 17 lbs. roving per hour.

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## Broken Drawing on Breakers

Can you give me a reason for broken drawing on the breakers? Foss (959).

There are many causes for the breaking of drawings. The doffer may be running too fast, in which case a reduction of speed would be to the advantage of the work and would also tend to increase the strength of the drawing. The doffer comb may have been striking and been worn rough or it may need cleaning. Drawing may also break by being stripped too far below the centre of the doffer. This may be remedied by raising the stroke of the comb.

Sometimes the drawing breaks down from too great a draft on the side drawing, in which case the end drawing will break as it leaves the doffer on the farthest end from the drawing rolls. Remedy: reduce the speed of the rolls. If the doffer gets dull, rough or out of true, the drawing will break down.

There are various ways of supporting the drawing as it passes to the rolls. On low stock it is a good idea to place a narrow apron under the comb, the same as for the Kershaw and Scotch feeds, and driven from the side drawing shaft.

Sometimes the short and long stock is not blended and picked right; this often causes a breaking of the drawing. Too heavy a feed making the drawing heavier at times than at others may be the cause. The comb may be too high or too low, too fast or too slow. Have good stripper belts and keep them tight and clean. When the side drawing breaks down often extra work and waste results. Too much

waste in the feed is another cause; also the stock getting too low or too high. If the drawing falls down raise the comb; if it pulls too tight, lower the comb. The centre of the stroke of the comb should be a little above the centre of the doffer. On long stock it is sometimes necessary to have a longer down-stroke and on short stock a longer up-stroke. Set the comb as close to the doffer as it can be and not strike, and keep the comb teeth free from grease.

All kinds of supports are used to keep the drawing from falling down, such as cone-shaped cylinders placed under the comb, wire and broomstick supports from the floor to comb, and many other contrivances. If the stock is really too low and short to make good drawing it is best to bring the first and second breakers together and place a short endless slat apron between after the fashion of the Blamire feed.

Sam Driver.

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## Soft Noses on Mules

We are spinning 7-8 to 1¼-run yarn on English and American mules and are troubled with soft noses on the bobbins which cause the filling to slip from the bobbin during weaving and make much waste. Can you suggest a remedy?

Ridley (542).

We have secured the following expert opinion on this trouble, the cause of which is very difficult to point out without knowing all the conditions in the mill where it exists.

Be sure that the quadrant on the mule is not set too far back, as this will invariably cause the mule to wind hard on the shoulder and soft or slack on the nose. If it is a Davis and Furber machine be sure that the two centre tracks are perfectly true and level, otherwise it will wind with soft places. The builder rail should also be in such a position as will insure an even wind. Holz.

In order to answer the question fully we ought to have full details of the style of mule, together with the number of teeth in the gears, the kind of quadrant plate, builder, etc. Soft noses on bobbins can often be remedied by setting the quadrant arm a little lower down. This has the effect of turning the spindles faster when the yarn is being wound on the nose, thus making them tighter.

The difficulty might also be caused by the faller leg knocking off the square stud too soon, or it may be that there is something that is imperfectly set just at the finish of the draw so that the weight is taken off the yarn and the yarn is not wound on the nose under tension. There are so many things that might cause this difficulty, and which vary with each type of mule, that we can give only general information without knowing more of the details. Wilts.

There are many things that might cause the trouble which Ridley mentions. The floor may be uneven; the track may drop as it goes toward

the head and the machine get ahead of the wind; the faller might trip too quickly. If we could have one of the bobbins sent us we think there would be no difficulty in finding a remedy.

Lincoln.

## Size of Wire

Can you give us information or some sort of a table showing the best card-clothing wire for fine and coarse stock? Field (927).

The way the batches come along now in most woolen card rooms makes it a hard task to name just the right size wire that would be best for general use. One batch may be a nice, fine all-wool lot; the next may be a mixture of very coarse wool and shoddy, and the next of fine wool and shoddy, or it may be a silk mix or a hair mix, etc. The carder hardly knows what will go on next. If batches of the same quality could follow each other, much better and more even roping could be made and would save the carder a good deal of trouble and much valuable time and waste would be saved to the interest of the company. When batches keep jumping from one run to six runs and vice versa, it is no wonder there is so much trouble with uneven roping.

When the carder has a set of cards on a 500 pound lot, 5 run warp running just to suit him, the lot is nearly run out, and the next lot may be 2½-run coarse wool and shoddy or some other kind much different from the 5-run lot.

I should recommend the following scale and number of wire for a set of cards for general run of work:

### First Breaker

Feed rolls, if not steel rings, which are decidedly the best.

Feed rolls, top and bottom, No. 18 convex or diamond point, straight steel wire.

Tumbler, No. 33 wire, steel.

First two workers, No. 32, the remainder No. 34 steel wire.

Strippers, No. 32, steel wire.

Cylinder, No. 33, the sheets steel wire.

Doffer, No. 33, steel wire.

Fancy, No. 30, sheets or filleting, steel wire.

### Second Breaker

Feed rolls, top and bottom for creels, No. 18, convex or diamond point straight steel wire.

Leader-in, No. 24, diamond point steel wire.

Tumbler, No. 33, steel wire.

Two workers, No. 34, the remainder No. 35.

Strippers, No. 32.

Cylinder, No. 34, sheets.

Doffer, No. 34.

Fancy, No. 32, sheets or filleting.

### Finisher

Apperly feed rolls, No. 24 bottom, and No. 26 top, diamond point straight steel wire.

Leader-in, No. 24, diamond point steel wire.

Tumbler, No. 34.

First two workers, No. 35, the remainder No. 36.
Strippers, No. 34.
Cylinder, No. 35, sheets.
Ring doffer, No. 35.
Fancy, No. 34, filleting.

### Card Clothing for a Set of Cards on Coarse Stock

If a set of cards is running permanently on coarse wool, or coarse wool and shoddy mixed, the numbers of the wire should be:

#### First Breaker

Feed rolls, if not steel rings, No. 18, convex wire.
Tumbler, No. 32.
Two workers, No. 30, the others No. 32.
Strippers, No. 30.
Cylinder sheets, No. 32.
Doffer, No. 32.
Fancy, No. 30.

#### Second Breaker

Feed rolls, No. 18, convex or diamond point wire, straight tooth.
Leader-in, No. 24.
Tumbler, No. 32, steel wire.
Workers, No. 33.
Strippers, No. 30.
Cylinder, No. 33, sheets.
Fancy, No. 32, sheets or filleting.
Doffer, No. 33.

FINISHER

Bottom rolls Apperly feed, No. 18, convex or diamond point wire, straight tooth.

Top rolls Apperly feed, No. 18, convex or diamond point wire, straight tooth.

Leader-in, No. 24.

Tumbler, No. 34.

Workers, No. 34

Strippers, No, 32.

Cylinder, No. 34, sheets.

Ring doffers, No. 34.

Fancy, No. 33, filleting.

Sam Driver.

## Speed and Size of Pulleys

Please give me a simple rule for calculating the speed and size of direct connected pulleys?

Manitoba (450).

Suppose two pulleys, A and B, are connected by a belt. Then:

Diam. of A $\times$ speed of A = diam. of B $\times$ speed of B.

From this it follows that:

Diam. of A = (diam. of B $\times$ speed of B) $\div$ speed A.

Also that:

Speed of A = (diam. of B $\times$ speed of B) $\div$ diam. of A.

Ex. A 12-inch pulley running 150 R.P.M. drives another pulley 225 R.P.M.

Find the size of the last named pulley.

(12 × 150) ÷ 225 = 8 inches, diam. of pulley running 225 R.P.M.

Ex. A 15-inch pulley running 80 R.P.M. drives a 10-inch pulley. Find the speed of the last-named pulley.

(15 × 80) ÷ 10 = 120 R.P.M. of 10-inch pulley.

The circumference may be used in place of the diameter if desired.

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## Density of Baled Wool

What is the density of Bagdad wool as imported in bales? How does its weight compare with that of water? Douglass (353).

A cubic foot of water weighs 1,000 ounces or 62½ pounds. A bale of Bagdad wool recently imported measured 51 inches long, 17 inches wide and 17 inches thick; cubic contents, 14,739 cubic inches. The gross weight was 360 pounds, equal to 675 ounces, or 42 pounds per cubic foot. The weight of this bale was 32½ per cent. less than that of water.

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## Grinding the Cylinder

I have always worked in a small mill and am not sure that I know the way grinding is done in large places or in other mills. Can you get one of your card room men to give me an explanation of his method of grinding.

Ashwell (997).

Before proceeding to grind any cylinder examine it carefully and see if any teeth are out of place. Level the grinder and then set it almost to touch; then start the grinder and set very lightly on both sides until the wire has become smooth; then set up a little more until finished. Beginners should be careful in setting the grinder until they have acquired the art of grinding by practice. In grinding the cylinders no special time can be given. Grinding must always be controlled by sight, ear, and touch. The saddle is a good thing to knock out dirt and keep the wire smooth.

If the grinding is done lightly and carefully the top edges of the wire will be formed something like the cutting edge of a carpenter's chisel, but on account of the lateral motion of the grinder the side edges will be ground off, leaving nothing put the sharp points. On the other hand, if the grinding is done in a hasty or imperfect and careless manner, the points of wire are ground in a broader and coarser manner. Should the grinding be too heavy, the pressure from the emery that this occasions will cause the points of wire to blister, making what is termed a hook. The card wire in this condition is detrimental to good carding and also prevents the cards from being stripped clean, increasing the amount of waste.

To attain the principal object in grinding it is necessary to grind slowly, lightly and carefully, with due regard to the quality and temper

of the wire. Grinding too hard is like bearing on too hard when grinding a knife; it will turn the edge up. Grinding wire too hard turns the points down, forming a hook at the point of the wire. A good way to keep the cylinder sharp is to have an emery roll placed under the cylinder; this roll must run faster than the cylinder surface to keep it sharp. It can be driven from the fancy, but this plan has never been generally adopted.

A small roll covered with No. 8 emery or finer, placed on top of the first and second breaker doffer is a good thing to keep the doffers sharp and smooth, and is used alternately with the dickey. The emery roll can be made to traverse by a little attachment put on the end of the shaft adapted for that purpose. A good plan when grinding cylinders is to have a spare worker or stripper covered with fancy wire placed on the top of the cylinder and set lightly in the cylinder when grinding. With careful setting there is no use in grinding the cylinder every month. It will run six months or a year, or even more. On dirty stock the cylinder may need brushing out once or twice a week.

To grind the fancy set it up to the grinder roll without any belt and allow it to run by pressure of the grinder, holding the fancy by friction. Run slow and steady or it may be ground untrue. Grind until all the creases are out. D. V.

## Carbonizing Wool by the Aluminum Process

Can you give me some information about the process of carbonizing wool with chloride of aluminum? We want to carbonize noils and keep them white; oil of vitriol turns them yellow. Gardner (826).

When using this process the wool or noils should be entered in a bath of chloride of aluminum standing at 6 to 7 Be., and then worked carefully for an hour or so. The material is then taken out, hydro-extracted, and dried at a medium temperature, then carbonized for one hour at 194° F. At the end of that time the vegetable matter in the wool can be removed by beating, and a washing in soft water with fuller's earth will remove all traces of the chloride.

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## Shoddy and Mungo Mixes

Can you tell me the best way to set cards for shoddy and mungo mixes. I seem to be unable to find information on this work. Is it necessary to keep the card in as good condition and the wire as sharp as in the carding of better grades of stock? Neilson (1422).

Mungo or very short shoddy is produced from hard felted cloths such as beavers, doeskins, etc. Shoddy is produced from cassimeres, worsteds, delaines, knit goods, etc., and is a much longer staple than mungo. Not many years ago it was thought that any old sets of cards with card clothing half gone were

good enough to card shoddy lots. Things have changed wonderfully since then. Carders have found out that the lower the stock the finer and the better the card clothing must be.

The workers and doffers must be kept good and sharp. These and the cylinder should be kept brushed out every two weeks. A false worker is a good thing in any card room, and can be used to good advantage in keeping the workers clean, sharp and smooth, all the time. The points of wire can be kept well polished, and quick to catch the stock and quick to let go.

Good judgment should be used as to how long the cards should be used without stripping. In order to make even roping they should be stripped before they begin to make uneven roping. Here is where many carders make a failure in carding low stock, in neglecting to see that the cards are properly stripped and at the proper time. It is better to strip them too early than too late. Much uneven roping is made by putting up the drawing before the card gets filled up after being stripped.

The greatest secret in carding shoddy lies in keeping the points of wire sharp, smooth and clean. The speed of the cylinder, 90 turns; doffers, 15 turns a minute; graduate the speed of the workers, driving the first the fastest, the next slower, and so on, the one next the fancy running the slowest. If any part of the card is out of true, stop at once and true

it. It is not the closest setting that does the best carding. There has been more loss of time and bad carding made by too close setting than in any other way. If set too close the points of wire strike and dull the points. It is better to be on the safe side than set too close. What is the use of grinding points on the wire and then knocking them off again with too close setting? In setting use the 28 gauge; first set the tumbler to cylinder, then set the leader-in to the tumbler very close and not strike; then set the feed rolls to the leader-in with gauge.

Set the workers progressively, commencing by setting the first farthest off. Set the strippers as close to the cylinder as possible and not to strike, also set the worker close to the stripper, set the doffer by 28 gauge, set the fancy on quite hard. Keep the stripper belts tight and clean. For low stock move the first and second breaker frames within six or eight inches of each other, and connect them by an endless apron something after the principle of a Blairmire feed; this will save waste and lots of trouble. There will be no drawing to break down, besides it makes more room.

The second breaker and finisher can be set the same as the first, only set the strippers off from the cylinder on the finisher; set the top doffer quite loose and the bottom doffer quite tight; condense the roping quite hard and see that it is not winding too tight on the

spools. Give a long draught of roping, say, two-thirds draught or more.

The best plan is to make the roping the size the spinner can handle it the best. The best way to keep the stock or shoddy from dropping under the card, is to keep the working points of the cylinder as clean as possible. It is not best to have the cards stripped all through every time; the best plan is to strip only those parts that are dirty. To strip the cards through every time is a waste of time and labor. Keep the points of the strippers clean.

Many carders fail to succeed with shoddy, not because it is shoddy, but because of the dirt and flocks it contains. There are various devices to prevent dropping by catching and returning them to the card, and one of the most common is the semi-circular screen set close and underneath the cylinder. The screens get choked up with dirt and flying, and then both dirt and flying goes back into the card again and into the goods. These devices have never become general on woolen cards. In carding shoddy, dirt is the worst thing there is to fight against.

The writer has had years of experience in carding these low materials and would advise those who have had trouble in carding short stock to study these suggestions carefully and earnestly, because they contain information which is the result of many years of practical experience on this class of work. Sam Driver.

## Carding Cotton Mixes

I am having trouble carding cotton mixes. The cotton is fairly well matted; the picker does not do very good work and neppy yarn is the result. We have an old wooden frame card, and lately when we moved from one floor to another the card was so racked and worn that we could not set it close enough to take out the neps. What would be the best method of setting, and to what size gauge? It is set to 29 now. Where is the setting most liable to help, and will the fancy help or cause the neps? We are now making 1½-run yarn; about 1½ draft on the spinning machine or about 48 inches of roving. The stock contains from 20 to 50 per cent. cotton. The ring doffers make about 14 turns a minute.

Clinton (774).

If the card is in such shape as Clinton says it is, the best thing to do is to open the window and throw it out. If the mixing picker is not doing good work, have the machine fixed so that it will. The mixing picker has nothing to do with making neps. Run the cotton and the stock that is mixed with it separately through the picker before mixing. I never set a card closer than 29-gauge on any kind of stock. If Clinton can set the stock with a 29-gauge without having it strike, the card is all right and the fault must be somewhere else, probably in the fancy. Set the fancy so you can just hear it on each side; then set both sides firmly into the cylinder. See that the stripper belt is tight; run the first breaker doffer faster

so as to get the stock out of the card quicker. Speed the ring doffers up to 18 or 20 turns and the condenser accordingly. The roving is apparently about right. Sam Driver.

## Matching Mixtures

How can I determine the proportions of each color in the enclosed samples of black and white mixed cloth? Mixture (440).

The best way to match textile mixtures of different colors is to make a small sample, weighing the stock on a grain scale, and carding and mixing the different colors on a hand card. One hundred grains is a convenient weight, as each grain is equivalent to 1 per cent. After it has been carded the stock is washed in neutral soap, dried and compared with the sample to be matched. Repeated tests are made until the right proportions are obtained. If facilities are at hand, it is a good plan to verify the hand-card sample by making a larger one of, say two pounds, carding it on the breaker card. The Torrance Mfg. Company, Harrison, N. J., build a small card for this purpose, and it is a very useful machine in a mill making mixed goods.

## Deodorizing Wool Scouring Liquor

Please advise us where we can find a deodorizing process for wool scouring liquor, and the best known process for regaining the grease. Westwood (609).

Our special correspondent in England, to whom this question was referred, writes as follows: "I don't think I need add anything to the explanation given in my last instalment of notes so far as regaining is concerned. The 'cracking' of the liquor with sulphuric acid is practically universal. But as to the deodorizing or bleaching the oil that is squeezed from the crude magma, I can give you one hint. Try the experiment of a 5 per cent. or so solution of bichromate of potash in hot water, slightly acidulated with sulphuric acid. The oil and water need agitating all the while so that the liberated oxygen can do its work in clearing the oil. Permanganate of potash can be used, but is not considered as good as the bichromate. This recipe is so simple that it may, perhaps, not be improved on."

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## Speeds of Doffer and Cylinder

What should be the relative speeds of the doffer and cylinder on first or second breakers?
Eaton (623).

The relative speed at which to run the cylinder and doffer can be determined only by taking into consideration all the circumstances, including the kind of stock, the size of the roving and yarn, the production expected, and the finish of the goods. If the stock consists of a mixture of cotton, shoddy and wool, and is to be free from specks when carded, every

effort must be made to ensure thorough carding of the fibres from the beginning of the process. If the stock is delivered in good condition to the cards the work of carding is greatly facilitated. The picking of the stock is a very important process and has much effect on subsequent operations. The object of picking is to obtain a thorough blending of the fibres and a uniform distribution of oil, or whatever lubricant is used. The heavy stock that falls close to the mouth of the picker should be carried back and evenly distributed over the batch before running it through the picker again.

The first carding takes place in the feeders, where the combs must be carefully adjusted, giving the scale plenty of time in which to be filled. The feed should be heavy enough to give the required amount of doubling, and not so heavy as to give the feed rolls a spring in the center. The feed rolls should be adjusted so that they will hold the stock while it is being combed out, and at the same time clear readily so as not to become clogged. This ensures even distribution of the stock to the tumblers, which is of great advantage in carding. If the stock is not delivered evenly to the cylinder it will not be delivered evenly to the doffer. On fine mixed lots, whether composed of all wool, or of cotton, wool and shoddy mixed, it is a good plan to run the doffer more slowly in order to keep the stock longer in the machine.

The speed of the doffer can be gradually increased as long as the drawing is clear and well mixed.

On heavy yarn, for which it is not necessary to have the stock carded perfectly clear, it has been my practice to get the stock out of the first breaker as rapidly as possible. I have obtained good results in running the feed rolls slow and the doffer fast, making the drawing lighter. This gives the same production, but of a better quality, and with the breaker running smoothly and not overcrowded.

The comb should be kept in good order with the teeth even and set close. Under these conditions the doffer will deliver well and strip the stock freely from the main cylinder. The cylinder and doffer of the second breaker are as a rule, to be run at about the same adjustment as that of the first breaker. The doffer should never be allowed to become glazed over or filled with waste and dirt. The points must take the stock freely from the cylinder. A smaller roll, 2½ or 3 inches in diameter, placed on the doffer and covered with short flexible fancy clothing, is found of great help to the doffer. It should be run the same way as the doffer, but at a slightly higher speed. Run the points of this so-called dickey far enough into the doffer wire, and keep them smooth and sharp. Anthony.

When running different kinds of stock, a cylinder speed of 90 revolutions per minute

gives the best results. There are cases, however, when this speed might be changed with advantage. For example, if a mill is running on all wool and fine stock that requires a good deal of carding and flies but little from the card while running, the main cylinder might be run somewhat higher, say 100 or 110 revolutions per minute. Then there are some instances where the best results can be obtained at a lower speed than 90, such as when the machine is running on short, coarse open stock, that drops more under the card. If shoddy is used in the mixes the card will not open it up so well at any speed below 90, and on that grade of stock, if the cylinders are run higher than 90, they will drop so much as not to be profitable.

The first breaker doffer is usually run a little slower than the second. We will assume that the finisher cards are fitted with Apperly feeds or some other feed of that description, so I will speak only of the second breaker doffer, which is assumed to be 24 or 30 inches in diameter. The usual speed of this doffer is about 15 turns per minute, but this speed must be varied according to circumstances. The main thing is to lay the feed on the feed table as soft and light as possible. If a large amount of stock is running through the cards it may be necessary, in order to keep the drawing down to the proper size, to run the second breaker doffer a little faster than 15. If good fine wool

is used, or stock where a large tube could be used, or when making light weight yarns from good stock, both first and second breakers may be run slower, in some cases as low as 10 revolutions per minute. For wool cards running on cotton, where the results are similar to cards running on coarse wool stocks, the speed should be about the same, or possibly a little lower.

A. B. H.

I have found that a speed of 85 r. p. m. serves very well for a breaker 48 inches in diameter. The relative speed of the cylinder and doffer depends on the kind of stock to be carded and the results desired in the goods. For instance, with a half blood territory wool that is imperfectly carded, it is very difficult to open it on the card. For a daily production of 225 pounds of yarn on a 48-inch set with a 24-inch doffer, a doffer speed of 10 or 11 turns will give good results. If the wool is specially open and lofty the doffer may be speeded to 12 or 13 turns. Usually I run the doffers on the first and second breakers at the same speed, unless the clothing on the cylinder is in poor condition; then I run the doffers faster in order to relieve the cylinder wire. I am running an iron wire cylinder today that has been run for 25 years. I find it is always better to run the doffer a little slower on wool and shoddy mixes than on all wool. I have run 20-inch doffers as slow as 8 turns on stock composed of 60 per cent. fine wool and 40 per cent. shoddy, spun to $3\frac{3}{4}$ runs, 48-inch set.

When running colored mixes better results can sometimes be obtained by reducing the speed of the doffer one or two turns per minute. It is not advisable to run the doffer so slow as to crowd the doffer wire, as this causes rough work, especially on shoddy mixes. With a 48-inch cylinder running 85 r.p.m. and a 24-inch doffer running 13 r. p. m. the surface speed of the cylinder will be 12,817 inches per minute, and the surface speed of the doffer 980 inches per minute, or in the proportion of 13 to 1. With a 42-inch cylinder running 98 r. p. m. and a 20-inch doffer running 10 r. p. m., the two surfaces will be running in the proportion of 20 to 1. The doffer should run fast enough to take all the stock the cylinder delivers, without crowding the doffer wire. I should want to increase the speed of the ring doffers by one or two revolutions per minute with Apperly feeds, and if the first and second breakers were already carrying as heavy a load as was desirable, I would increase the speed of the breaker doffers. This would prevent the doffer from dwelling at the cylinder long enough to get overcrowded.

G. L. P.

## Testing Merino Yarns

Please give me a formula for testing merino yarns to find the proportion of cotton and wool.

Hilton (788).

The proportions of cotton and wool in mixed fabrics are easily determined by weighing a sam-

ple before and after boiling out in a solution of caustic potash or soda, boiling it for about fifteen minutes and then drying. The solution should contain about 10 per cent. by weight of the caustic, that is to say, 90 per cent. of water and 10 per cent. of caustic alkali. The wool is dissolved by the alkali and the cotton is but little affected. Consequently the residue represents the amount of cotton in the original sample. It is well to add about 5 per cent. of the weight of the residue to allow for the loss of weight of the cotton in the process.

## Scouring Wool

We are using a greasy medium crossbred merino wool and scour it with a mixture of lard and paraffine oils. The yarn comes out a grayish tint after scouring and takes twice as much soap and handling to get it a clear white. Can you give me any information in regard to the oil and soap to use? Roseau (634).

The difficulty encountered in this case is undoubtedly due to the original scouring of the wool in the raw state. The great amount of grease usually carried by these wools is such that it must all be removed in the first scouring. To do this properly requires that the first scour liquor should be heated to 120 degrees Fahrenheit and contain both soap and sal soda. After passing through this bath it is further treated in a bath of soap only at the same temperature and followed by a rinse of warm water.

The amount of soap necessary can be determined only by a trial and the same applies to the sal soda. In the first scour bath it will be found valuable to add small quantities of ordinary kerosene, say half a pint. This gradually becomes emulsified with the aid of the soap and has a very beneficial action on the wool grease, besides softening the wool. It leaves no odor.

The second scour liquor in turn becomes the first scour liquor by the addition of soap and sal soda, while the rinse waters pass on and become second and first scours.

After the scoured wool has been dried and oiled and converted into yarns, then any of the defects present are visible. As a rule, if too much wool oil has not been used, an ordinary scour with soap liquors should be ample to remove all added grease.

Probably the difficulty is not with either the wool or the soap, but with lime or magnesia in the water used, and which in the yarn scouring unites with the lard oil, forming a dirty, disagreeable residue on the wool fibres that resists ordinary scouring processes. In the absence of a sample of the wool or the water used, the above explanation and suggestions are the best we can offer. George Wallace.

## Even and Uneven Roving

I am boss spinner in a woolen mill. About two weeks ago, the weavers complained about lumps in the filling which broke in the eye of

the shuttle. The mules are set just the same as they always were. Can you tell me where the trouble is? Grant (994).

Since carding and spinning go hand in hand in woolen manufacturing, it is first necessary to refer briefly to carding. As a rule the carder calculates his roving to be drawn down to about one half, on the mule, in order to assist in drawing out and reducing any lumps or other irregularities in the roving in the final yarn produced. There will be no trouble in drawing out a good even roving made from long, even-stapled wools, this one-half or more in spinning; however, the best spinner will find it impossible to draw out uneven roving or such as made from short staple stock more than one-third, without keeping the mule standing most of the time piecing up broken ends.

With reference to uneven roving delivered to the spinning room, the lumpy sorts will be the ones making the most trouble, in fact if not impossible for a fine thread to be spun out of it, since it is a well-known law in spinning that the lumps will take the twist only after the thin places between the lumps are twisted extra hard. This naturally tends to increase in proportion the size of the lumps, and in turn reduce the thinner places still more.

In order to explain this subject, the accompanying two illustrations are given. Fig. 1 represents an uneven, lumpy, unspun roving or carded wool. Examining the illustration, we

will find that instead of having an even surface, the roving is lumpy, caused either possibly on account of dull card wires, or insufficient carding, or improperly prepared stock, etc. Such roving may now and then occur in any mill, but it should be seldom the case, and if found, the trouble at once remedied by proper attention to the set of cards where it was made.

1

2

In drawing out this roving on the mule, the same receives a few turns per inch as the carriage backs off. The drafting occurs at this point, and since the tendency is for the twist to take effect between the lumps, as previously mentioned, it follows that the lumps are more or less untouched with reference to twists by the mule, remaining soft and pliable, and being drawn out only slightly in size. The thinner places between the lumps have taken all the twist which actually ought to have gone in the full length of the thread under operation, said fine hard twisted portions of the yarn not drawing down any to speak of. For this reason the mule does little toward correcting such imperfect roving, resulting in an uneven yarn as

readily seen by means of examining diagram Fig. 2, where we see that the bunches, as mentioned before, although slightly drawn out as to size, are yet distinct in the thread, the thinner portions of the thread having taken all the twist, clearly showing too much of it. The reason for this is found in the fact that the larger in circumference a body, the harder it is to revolve it, and since the lumps in the roving are of a larger diameter as compared to the thinner portions of the thread, it consequently follows that said lumpy portions of the thread acquire little, if any, twist compared to the thinner portions; in fact all the thinner portions in the full stretch of roving under operation must be twisted solidly into a wire, as we might say, before twist is put in the larger places, *i. e.*, the bunches, each bunch acting as a pin of a fixed lever for the length of the thin roving adjoining.

The proper amount of the draft to be put in the yarn at the mule, requires good judgment, the rule usually observed being that the longer and coarser the stock, the quicker the drawing should be. If the roving pulls out from between the draft rollers during drawing, it is a sure sign that the draft is too slow, and for which reason put on a larger draft gear (backing off gear), or let out on the upper steady rope and take up at the bottom. If the roving snaps off about half way between the draft roll and the tops of the spindle during drawing, it is an indication that

the carriage is backing off too quickly, the twist not having a chance to take hold, and in which instance reverse the previously given advice.

Conrad.

## Ammonia in Wool Scouring

Is there any other form of ammonia besides aqua, such as carbonate of sulphate, that would be more economical in wool scouring than the liquid? Elm Hill (682).

A number of wool scourers to whom we have addressed inquiries advise us that they know of no other form of ammonia for wool scouring than the aqua, and that is very economical and convenient.

## Covering Cylinder Grinders

I have just taken a position as overseer in an eight-set mill and find the cards in a bad state, and the grinders nearly used up. What I want to find out is how to cover cylinder grinders with emery and also with emery cloth. And I would like to know which one does the better work. Connie (1039)

A first-class emery cylinder well and evenly covered will do good work. It is also regarded as a time saver. These facts have operated to retard the use of the traverse grinder to some extent. The cylinder must be true and evenly balanced. The secret of putting the emery on even lies in putting on an even covering of glue. Some use glue alone; some use half glue and

half glycerine, and some use Le Page's fish glue. I use the last and prefer it.

Many mills are now using emery cloth filleting for covering grinders, because it can be put on so much more evenly than by the old way. First wind the emery fillet on the tension drum, the same as you would if covering a worker. Have the clyinder clean and perfectly free from grease so that the glue will stick to the surface. Have the glue warm and in some shallow dish, so that you can dip your fingers in the glue and rub it over the cylinder with your hands instead of a brush. By putting it on this way you can get it more even and thinner on the cylinder. The glue should be as even and as thin as possible.

When you have the cylinder covered with glue, wash your hands and commence to wind on the emery fillet as you would clothe a worker, being careful that no loose emery drops on the cylinder or under the fillet. D. V.

## Winding Under on Woolen Mules

We are having considerable trouble with the yarn winding under the bobbins on our mules. This causes the yarn to break when it is spooled or woven from the shuttle. We think it is caused by the spinner's allowing the fallers to get too high. Are we right? If not, what is the remedy? Tippecanoe (377).

This trouble of winding under on woolen mules is very annoying and, unfortunately, very fre-

quent in woolen mills. Attention to the care and management of the machine will generally remedy the trouble, but is one in which constant attention is essential, otherwise the difficulty will recur. A prominent builder of spinning machinery, to whom this question was submitted, writes the following:

"There are several things that can cause this trouble. In the first place the faller chain may be too high; secondly, the mule may be backing off too much, leaving the ends too slack; thirdly, there may be a flat place on the roll that runs on the rail; fourthly, the track may not be level, or there may be a low spot in the track as a result of the floor having sprung; again the trouble may arise from the shoe being too straight. The remedies for the above faults will readily suggest themselves."

## Care of Garnett Machines

I would like to see an article in the Textile World Record on taking care of and running garnett machines. Lockhart (578).

The garnett machine is used to card and open out hard or soft twisted yarn waste. Knots and cops pulled from the bobbin should be cut before being fed to the machine. The waste should be sorted and such foreign matters as broom corn, sticks, nails, leather, etc., taken out. Garnett machines are not made to work up such things. The garnett machine is very delicate and expen-

sive and the wire requires great care, while repairs are very costly.

The material should be fed on evenly and not very heavy, a specially adapted Bramwell feed is the best. A garnett machine will do just so much work and do it well, and no more. Dirty or dusty waste should be run through a duster; the cleaner the stock the longer the machines will run without stripping.

Good judgment must be used in setting the machine in order to obtain the best results and it must be set to suit the particular quality and class of stock to be manipulated. In other respects it is set like a card. The feed rolls should be set so they will mesh each other if possible. Set the top workers with a graduating gauge — 32, 33, 34. The fancy and fancy stripper should be set to the cylinder with a 36-gauge, or as close as possible without striking. Set the doffers with a 34 guage or as close as possible without striking.

The fancy driving pulleys on cylinder shaft and on the fancy shaft should be covered with leather, with the flesh side out and the belt should be put on the fancy pulley and run with the hair side next to the pulley. The fancy should not be allowed to run if it gets filled with stock. Keep it stripped clean. So far as good work is concerned the fancy is the most important part of the garnett machine. If the fancy does not work properly everything else will go wrong. The belts on the fancy must be so

tight they cannot slip, and the cylinders and doffers must be cleaned before they become glazed over. If these suggestions are carried out there will be no trouble in getting good work from the garnett machine.

Sam Driver.

## Soft Noses on Cops

How can a woolen or worsted mule be prevented from making soft noses on tops of cops without a nosing motion? Stamford (670).

There are various things that would cause a bobbin or cop to be soft on the top. First, if the quadrant arm is too far from the vertical the nose will be too loose. Second, the trouble might be in the builder shoes; they not being adjusted properly, as is often the case. Set the rail on the forward and back shoes so that when the builder is wound up the studs will be close to the top of the incline. The adjustment for both shoes at once is made by the slot in that part of the rail opposite the inclined side. If necessary change the position of the back shoe, without moving the front shoes, by the small rod connecting the two. For cops I would suggest that the shoe on the inside be set so that the end of the builder rail be just on the edge of the groove on the shoe, ready to start down as soon as the builder starts to work.

It is sometimes necessary to have a special shoe on the front end of the builder rail. For

cops this can be secured from the shops where the mules are made. At the rear end of the rail there should be a hinged flip, one end hinged to the rail and the other end resting on a set screw, and as the rail is lowered the flip, which is adjustable, becomes raised on a level with the rail. Now the end attached to the rail is lowered with it while the end resting on the casting remains stationary. As a result the angle on the corner of the flip becomes raised above the surface of the builder rail, and as the carriage comes against the back stops the builder rail traveler, strikes the projection thus formed, and imparts a sharp flip to the winding faller. The effect of this is to wind a few turns of yarn down over the nose of the bobbin, making a firm nose and preventing the yarn from slubbing up the bobbin.

Then again the trouble might be in the drum gear, which is driven by the quadrant chain. This gear should be larger for the winding of cops. They have any desired number of teeth for this gear at the shops where the mules are made.

Spinner.

## Core Yarn

We enclose a sample of core yarn and would like you to advise us how this yarn is made; that is, how the cotton thread is inserted.

Elm Hill (783).

A number of years ago I experimented with this yarn, making it first on an ordinary twister

by running a cotton thread and a sliver of carded roving from the woolen finisher card together, and obtained encouraging although imperfect results. Later I learned of a better method, which consisted in running the carded cotton thread back of the whip roll through the rub rolls of the condenser on a woolen card and letting the condenser rolls rub the carded sliver around the cotton. In this way I obtained very good results indeed and have samples of cloth woven with both warp and filling made of this core yarn. The sample submitted has two core threads and I am in doubt whether these two were run together behind the whip roll, or whether two core threads were taken from the card and run on the twister. Possibly it was made by a third method by which the loosely twisted two-ply cotton thread was run on the card. A. Sedal.

## Cost of Raw Material

We have run our woolen material heretofore on Kentucky jeans, but recently have begun the manufacture of a so-called all wool piece dyed cheviot, made from a mixture of coarse wool and waste. We had determined the shrinkage in manufacturing and cost of our jean fabric very closely from statistics of operations during previous years. We have no such statistics to guide us with the new cloth and have estimated the cost as best we can. We would like to know what is the best and quickest way of testing the accuracy of our estimate as we do not want

to continue manufacturing the goods if the business is to result in a loss.

Chattanooga (455).

The cost of raw material can be determined by keeping a record of a lot of stock; the larger the lot the more accurate is the test. The record should be kept of the weight and value of the raw material as well as of the waste obtained from it, also of the number of yards of finished cloth made from the lot of stock selected for the test. Following is the record of a test of a piece dyed cheviot fabric which will illustrate the method:

| | |
|---|---|
| Stock weighed in the picking room, | |
| 6,790 lbs. wool, at 45c. per lb..... | $3,055.50 |
| 12,576 lbs. waste, at 15c. per lb ..... | 1,885.60 |
| Total ..... | $4,941.10 |
| Waste made from this batch, | |
| 2,904 lbs. at 15c. per lb. ..... | 435.60 |
| Net cost of stock ..... | $4,505.50 |

The finished cloth obtained from this material amounted to 7,227 yards 6-4. The cost of the raw material per yard was therefore:

$4,505.50 ÷ 7,227 = $0.623, cost of raw material per yard.

There is no method as simple as this for determining the cost of manufacturing. The best method is to extend the product for any period between inventories at the estimated cost and then comparing the total with the actual cost as indicated by the mill accounts.

## Advantages of Apperly Feed

Our finisher card has been fed from a creel just the same as the second breaker. I know several reasons why an Apperly feed would be better, but I want more so I can throw out the old creels and get better roping. Will you give me several reasons? Thomas (984).

Among the advantages claimed for this feeder are:

1 Improvement in the roping produced, making the yarn more even and stronger with less twist

2 Increase of production

3 Saving of labor in card room

4 Saving of waste in card room and also in spinning room

5 More perfect mixing

6 Saving of time in changing lots

7 Saving of space

8 The Kemp positive geared traveller lays the stock down on the feed table without strain the full width of the card so that it goes evenly to the feed rolls so fine and heavy ends are avoided. J. M. P.

## Yarn Numbering

Please state the relation between the worsted and cut systems of yarn numbering. What would 2-20 cut yarn be equivalent to by the worsted system? Broome (358).

The Simplex Yarn Tables (published by Textile World Record, price 50 cents) give an explanation

of the basis of each system and also enable one to find the equivalent of any system in the units of the others. No. 1 worsted = 2-3 cotton; 1.86 linen lea or woolen cut; .35 run. No. 1 linen lea or woolen cut = .535 worsted; .357 cotton; .1875 run. From this it is clear that No. 2-20 cut is equal to single 10 cut or No. 5.35 worsted.

As all our systems of yarn numbering are based upon the fixed weight of one pound, their proportions are expressed by the length of the skeins used for them. Thus: Linen or woolen cut, 300 yards; worsted, 560 yards; cotton, 840 yards; woolen run, 1,600 yards.

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## Run and Grain Systems

We wish to change our system of weighing yarns. We have been using the grain system based on 20 yards. We want to use the run system. What would 70 or 80 grain yarn equal by the run system? Maryland (486).

The reduction of the 20-yard grain system is very simple.

Dividing 87½ by the grains gives the runs.

Dividing 87½ by the runs gives the grains.

Ex. Find the run equivalent of 70 grain yarn.— $87.5 \div 70 = 1\frac{1}{4}$ runs.

Ex.. Find the run equivalent of 80 grain yarn.— $87.5 \div 80 = 1.09$, or nearly 1 1-10 runs.

Ex. Find the run equivalent of 50 grain yarn.— $87.5 \div 50 = 1$ 7-8 runs.

Ex. Find the grain equivalent of 2 run yarn. — $87.5 \div 2 = 43\frac{3}{4}$ grains.

Ex. Find grain equivalent of 3 run yarn.— $87.5 \div 3 = 29$ 2-10 grains.

Ex. Find the grain equivalent of 5 run yarn. — $87.5 \div 5 = 17\frac{1}{2}$ grains.

The runs indicate the number of 1600-yard lengths in one pound. The various equivalents of this basis are as fullows:

1600-yard lengths in one pound.

100-yard lengths in one ounce.

1-yard length in 4 3-8 grains.

The run system is very convenient for calculating the weight of yarn in ounces, because the runs indicate the number of hundred-yard lengths per ounce. Thus $1\frac{1}{4}$ runs measure 125 yards per ounce.

Ex. Find ounces of warp per yard of cloth made with 1440 ends of $1\frac{1}{4}$ run yarn.— $1440 \div 125 = 11.5$ ounces warp per yard.

Ex. Find ounces of filling per yard of cloth woven 80 inches wide with 28 picks of 2 run yarn.

$80 \times 28 = 2240$ yards.

$2240 \div 200 = 11.2$ ounces filling per yard.

No allowance is here made for take-up in warp or slack in filling.

## Calculating Weight of Sliver

The first breaker of a set of woolen cards is fitted with a Bramwell feed, the second breaker with a Torrance creel, and the third breaker or finisher card with an Apperly feed or a creel.

What is the method of calculating the weight of ends or sliver that should enter these feeds in order to give a 6-run roving?

Milton (867).

No set rule can be given for calculating the size of the drawing for a given size of roving. The carder must use his own judgment, taking care not to have it too heavy or there will be difficulty in passing it through the guides on the second breaker. If the drawing is too heavy on the feed table of the Apperly feed the roving is apt to be lumpy; the finer the drawing and the more of it on the feed table the better the roving. With a creel on the second breaker and an Apperley feed on the finisher the size of the roving is regulated by an adjustment of the gears.

Sam Driver.

## Turning up Cylinders, Etc.

I am carder in a mill that is going to shut down for two weeks to give the workers a vacation and make a lot of repairs. A great deal of work can be done in the card room, and I wish you would write me, or publish in the Textile World Record, the best way of turning cylinders, doffers, workers, etc.

Colo (1133).

In turning up a lag cylinder first take out the ends and have the second hand or some other responsible person tighten all the inside lag bolts. The bearings should be rebabbitted if worn much. The cylinder should be placed on balancing irons to see if it is balanced, espec-

ially if it is a finisher cylinder. These important points are very often neglected. It is against the spinner's interest if these things are neglected.

Get a spirit level and place the doffer, cylinder and tumbler in position; get them as level as possible; be sure to have the cylinder level by all means. Place the rest or turning lathe on the card frame, block up high enough so that the cutting edge of the tool will be a little above the centre of the cylinder. Level the rest lengthways and sideways; be sure you get it perfectly level both ways or your cylinder will not be turned off true. Fasten rest to frame with a long bolt or carpenter's large screw clamp; see that all the old tacks are out; hammer the plugs down and replace all that go down; get a stick and set both ends of rest the same distance from the cylinder shaft.

Drive a tack half way in each end and middle of cylinder. Now hook a steel tape on the tacks and run it around the cylinder. This will give the exact circumference of both ends and the middle of the cylinder and tell you if it is the same at both ends. You very often find one end of the cylinder larger than the other. When this is the case, set the tool so that it will take off a little heavier shaving on the side that is largest.

Have the cutting tool sharp and set up to cylinder on both ends; set the tool so it will not have too much cutting edge; set it so it will cut on the corner first time across. Run the

tape around every time across; take very light shavings. Before going across each time move the cutting edge of the tool so it will cut a little wider shaving each time. When finished, do not use sand paper; it will be smooth enough. Run the tape around once more; when finished, both ends and the middle should be exactly alike in circumference.

Draw a line with a pencil around the cylinder one-half inch from each edge; then place the pencil on the rest and draw a line across the cylinder; this is the starting line at which to commence dividing the circumference.

If there are 21 sheets, divide the circumference of the cylinder into 21 spaces. When you have it spaced off correctly make dot marks at each space; use some kind of a flat tool made with a narrow, sharp, flat point, something like a file. Place this tool on the rest flat side down and mark off the spaces; this makes a straight line and cuts in the wood and is better than a pencil mark. When you cut off the welts on each sheet, place the point of the knife in the cut mark. This will guide the knife and you can cut off the welts perfectly straight. When spaced off, remove the rest, leaving the blocks on; clean up the shaving and we are ready to nail on the cylinder sheets.

The doffer can be turned off the same as the cylinder on some makes of cards by raising the bearing up high enough and placing the rest on the end of the card frame.

Fancies and other small rolls can be turned off in the grinder frame, always remembering to have the cutting edge of the tool a little above the centre of the frame.

When turning off a block cylinder set the cutting edge of the tool near the point or corner of tool; some use a gouge tool. D. R. S.

## White Wool for Mixtures

I would like information on the method of preparing white wool for mixtures.

W. W. (986).

When white wool is mixed with black in the raw state the mixture has a better appearance if the white retains a part of its natural yellow shade. Bleached white makes the mixture look harsh when mixed with black, on account of the sharp contrast. Moreover bleaching is expensive. Various methods have been introduced to displace bleaching by removing a portion of the yellow shade of the fibre, among them being the following:

1. For 100 pounds of wool, 1½ pounds of oxalic acid and 1 pound of sulphuric acid 66 Be., are dissolved separately, then added to 2,000 pounds of water at 120° F. When starting the bath it is advisable to add double the quantities named. The wool is then entered and at the end of 35 or 40 minutes the yellow shade will be largely removed. The wool is then taken out and rinsed several times.

2. For 100 pounds of wool 1¼ pounds of chloride of tin and 1 pound of hydrochloric acid are dissolved in water and then added to the bath, which is heated to 165° F. and ¼ to 4-10 of a pound of sulphate of indigo paste added. The dyer must regulate the amount of indigo to suit the requirements of each case. The wool is worked in this bath for one hour.

3. For 100 pounds of wool ¼ to 4-10 of a pound of Prussian blue is dissolved with four times the quantity of oxalic acid, forming a concentrated solution. This is added to the bath with 13 to 14 pounds of sulphate of soda. The wool is worked from three-quarters to one hour at 150° F.

4. For 100 pounds of wool ¼ to ½ an ounce of Formyl Violet S 4 B, ½ pound of acetic acid (increased if the water contains lime) and 4 pounds of sulphate of soda are dissolved in the bath in which the wool is worked at 160° F.

5. This is process 4 with 1 to 1½ ounces of cyanole extra added to the bath.

6. The wool is worked in a bath of bisulphite of soda at 2° Be. at a temperature of 100° F., to which is added 1-3 of an ounce of methylene blue. The wool is worked for one hour, then taken out and rinsed. Any of the above methods will leave the wool in good condition for mixes, and all have the advantage of simplicity,

P. Hoffman.

## Wire for Leader-In.

What kind of wire is used on the leader-in for ordinary to fine work, and is a wooden or iron leader the best? Any other information about the feed would be prized by me as the wool does not come off our cards as evenly as it ought to. Snelling (979)

In many mills there is no portion of a carding machine so badly neglected as the feed-rolls and their accessory cylinders. It is safe to assert that if wool enters a card irregularly its exit will be irregular, and no subsequent arrangement will completely remedy such defect.

For the first card of a set the metallic feed-rolls and the steel ring burr-cylinder are indispensable; there can be no doubt on that question, so I will, for the present, confine my remarks more particularly to the best form and arrangement of these parts for the second and third cards. A wooden licker, or leader-in, should never be used, but instead of it I would recommend the iron cylinder, as it always keeps true, besides forming a solid base for the clothing. Whether it is of iron or wood the clothing should be stretched on as tightly as possible so as to maintain a stiff, upright position of the teeth. No. 22 diamond point wire for ordinary to fine work will answer very well. The bottom feed-roll should be covered with the same kind of clothing, and the top roll with Belgian pattern diamond point, which will be easier to keep clear.

The wiper or small stripper may be covered

with ordinary No. 30 to 32 round wire, ground smooth, and care should be taken not to injure the teeth by pressing them forward with the grinder. There is nothing so hard to grind in a card as this roll, on account of its small circumference, and if it is done carelessly neither it nor the feed-rolls will work satisfactorily. Don't try to make a fine point on it; smoothness is more essential.

For some kinds of wool the Belgian pattern card covering might not be so suitable as round wire or diamond point, as these have longer teeth than the Belgian, but for fine wool or thin feeds the latter clothing has some advantages.

Many carders are troubled with the diamond point leaders-in filling up with wool and gumming in a short time. This makes them difficult to clean without injury to the teeth; they soon lose their point also, and are never good for much afterwards, as it is next to impossible to grind a good point on them when worn. These difficulties are at once remedied, and with a saving in waste as well as an improvement in the work, by adopting the following plan; namely, to place a small fancy in the hollow over the leader-in and tumbler. It should be 5 inches in diameter when covered with ordinary fancy wire, and driven with a straight belt from the end of the stripper. Its surface speed should be faster than that of the leader-in, and it is set so as to raise the wool on the latter effectually, precisely as the fancy does on the

main cylinder. This enables the tumbler to clear the leader-in thoroughly at each revolution, and the latter may be run constantly for months without cleaning, thus saving several pounds of waste each week. The point on the leader-in will always be in good order by the use of this fancy, thus enabling it to comb out the fibres from the feed-rolls in the best possible manner.

The tumbler especially needs to be smooth as well as to be ground and kept at a good working point, so as not only to clear the leader-in regularly, but also to part with its wool to the main cylinder with the most facility. The size of the wire on a tumbler is not of so much consequence, but No. 30 to 32 will do, and it must always be kept perfectly true.

It remains only to be said how best to adjust rolls and cylinders. First of all, see that they are level, then begin by setting the tumbler as close as possible (without touching) to the main cylinder, then the leader-in and lower feed-roll to each other, and the tumbler as close as can be. The upper feed-roll may be set one-sixteenth of an inch from the leader-in and lower feed-roll. The wiper or small stripper is adjusted close to the upper feed-roll and leader-in, so as just to clear; the fancy quite hard, at first, on the leader-in, but just to clear the tumbler.

It will be seen that to adjust these cylinders as described, they must be made true, and so maintained; if not, the result will be much loss

of efficiency in regard to thorough opening and carding of the wool, besides an increase of waste and loss of time in cleaning it from the various cylinders. On the other hand, if the cylinders are true and arranged as described, the feed-rolls will keep clear, the point of the leader-in will be preserved for years, the work will be much improved, and a considerable amount of worry saved the carder.

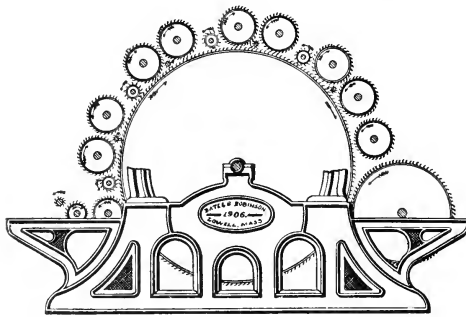
In describing this arrangement it must be understood to refer to the modern card machine, with the leader-in revolving in the same direction as the main cylinder, the latter clearing the tumbler, which runs in the opposite direction. The suggestions apply also to the Apperly feeder, which contains its own feed-rolls, as well as two feed-rolls for the ordinary spool rack or creel, and which are usually attached to the card-frame.

The wool is entered into the card free from humps or other irregularities, and possibly one-half the carding may be done at that point, before going farther. No accumulation of fibres or dirt must be allowed on any of these rolls or cylinders. I would particularly impress upon Snelling the importance of studying this matter for himself, and I think he will need but little urging afterwards to spend a good deal of care on these generally despised parts of a carding machine. John Randolph.

# INDEX.

# The Bates & Robinson

**Patented**




The purpose of our system of carding is to improve the quality of the product, to straighten the fibers and make them lie more parallel, and to work up short stock or low grade stock into roving of an excellent quality. Our system can be readily applied to old carding machines, and it can be very rapidly and accurately adjusted. The workers can be easily removed for stripping and grinding. The yarn made by our process is evener and stronger as the fibres are laid more parallel.

It has long been recognized that some process of recarding would greatly improve the product of woolen cards and economize space and labor. We believe we have perfected the process.

In our process we place the workers in pairs, using the strippers for the first worker and the first worker without change. The second worker is brought up to be in carding contact with the first worker and its direction of rotation is reversed so that it carries the stock over and back to the point between the two workers where an additional carding takes place.

To carry the stock back and to strip the second worker, and also to prevent the stock from accumulating in the trianglar space between the workers, we use a small transfer roll as shown in the cut, which strips the second worker and transfers the stock to the first worker.

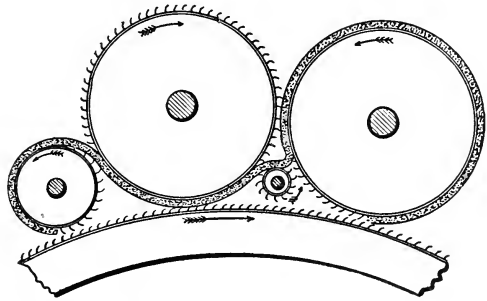
FOR FURTHER PARTICULARS, ADDRESS

# Bates & Robinson

## 148 Warren St.

# Double Carding System

**Aug. 22, 1905**



The cut above shows the operation of our system as applied to a single pair of workers.

By bringing the workers together in this fashion we can ordinarily get room for two extra workers, which is, of course, an advantage.

Referring to the cut, it will be readily seen that the stock is carded between the first worker and the main cylinder, between the second worker and the main cylinder, and also between the first and second workers. In addition to this, the stock carried around by the second worker is recarded between the first worker and the main cylinder.

We estimate that with our device applied to a 48-inch card we obtain the quantity of product of a 60-inch card of the old style. With other sizes of cards, the proportion is about the same.

It is a very simple matter to apply our process to old cards as we supply new arches, properly arranged, together with the transfer rolls and any additional workers which are necessary. We thus make of the old card, a card which is better than a new card, and save the manufacturer the expense of a new card.

Some of the mills where we have our system attached to their old cards, claim a saving of from five to twenty dollars per day, per set of cards, by lowering the cost of their stock.

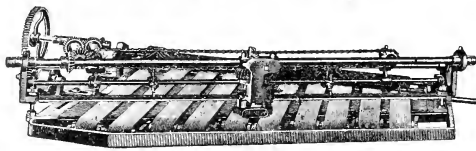
We would be pleased to give you the names of the many firms where we have installed our system, and who claim this saving.

# Machine Company

## Lowell, Mass.

# The Bates Feed

## for wool cards



The accompanying illustration represents the Bates Feed, patented, for Second Breaker and Finisher Wool Cards.

It is constructed with positively driven fluted distributing rolls. These rolls are kept together by means of a weight so arranged that they can adjust themselves to all sizes of drawing. They lay the drawing on the feed without any strain; and by so doing there is no latch required at either side of the feed.

The feed is constructed with side plates which take the place of all spike straps, which often break and run into the card and spoil feed-rolls and licker-in.

The feed is also built with metalic feed-rolls. The teeth of these rolls intersect, so as to prevent the stock from pulling through in the middle of the feed, and causing coarse and lumpy yarn. No card clothing is required for the feed-rolls, consequently, there is no jamming down on the ends, and no changing of card clothing, at a cost of eight to ten dollars per feed.

The feed is ready to run when delivered at the mill. It has no light, wide side, and heavy in the middle. It will run with a soft, shoddy drawing, and not break back of the rolls, as there is no strain on the drawing after it passes through the rolls.

The rolls lay the edge of the feed straight. This prevents the stock from dropping on the floor outside of the card.

These feeds are in the best mills in America. Will put one on thirty days' trial for any reliable firm.

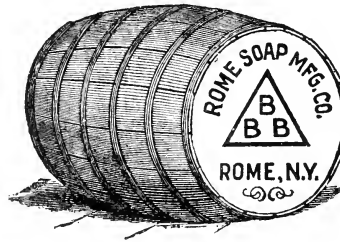
For further particulars, address

## Bates & Robinson Machine Company

**P. O. Box 539** **Lowell, Mass.**

# Rome Soap Mfg. Co.

Rome, N. Y.

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C and Westmoreland Sts., Philadelphia, Pa., U. S. A.

It is peculiarly proper in this booklet on "KINKS" to mention our recently patented nosing motion and yarn evener for woolen mules. This device absolutely prevents any "kinks" in yarns, and produces uniform and perfect bobbins. It also prevents yarn being thrown off the point of the bobbin, and on finer grades of stock it will pay for itself in one week's time. The agent of one mill where there are over fifty mules, states that in his opinion it is the greatest improvement that has been attached to a woolen mule in the last twenty years. Write for circular and full information.

---

For thirty-seven years we have been devoting our energies to the development and improvement of wool spinning mules. We are the only firm which confines itself to this specialty. Is it not fair to assume that we can build mules to better advantage than others? Ought we not to make the best mule? Think it over. We build mules for all classes of yarn that can be spun upon the woolen principle. There are about 1500 mills in the United States using woolen mules. Over 800 are using ours, a large proportion of which use ours exclusively.

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# Johnson & Bassett

## Worcester, Mass.